GOVERNMENT FOLLOW-UP ON IJC INTERIM REPORT RECOMMENDATIONS ON RED RIVER FLOODING

July 1998

Following the devastating floods of 1997 in the Red River basin, the governments of Canada and the United States asked the International Joint Commission (IJC) to investigate the causes and effects of flooding in the basin and to provide them with an interim report by the end of 1997. On December 31, 1997, the International Joint Commission reported to the governments of Canada and the United States on interim measures that should be undertaken to prepare for possible floods in the short-term. The interim report cautioned against complacency, noted that major flooding could occur at any time, and made 40 recommendations regarding flood forecasting, monitoring improvements, emergency measures and planning, environmental concerns, and floodplain management including zoning, legislation, and enforcement.

The IJC asked its International Red River Basin Task Force to report on governments' progress in implementing the 40 recommendations. The results of the Task Force's inquiries are summarized in the attached table. Although the recommendations were directed primarily towards federal, state, and provincial governments, the Task Force also noted in the table areas in which it plans further action.

The different jurisdictions report action on at least 70 percent of the recommendations. The actual response is likely to be higher as some activity has not been formally reported.

The IJC will continue to monitor the progress of governments in taking action on the 40 recommendations.

Future Floods	
1. Alert the public in the Red River basin to the reality that while the 1997 flood had a return interval ranging from 100 to 500 years, depending on the location, there is a statistical probability of a similar flood each year. Flood preparedness must be part of the culture of the Red River valley. Put simply, the flood of 1997 or an even larger one could happen any year.	
United States	In the evaluation of short- and long-term flood damage reduction measures with communities, the Army Corps of Engineers stresses the remaining risk, even after the measures have been implemented.
Minnesota	Three flood related brochures were prepared and distributed. Project WET (Water Education for Teachers) has been enhanced and expanded. Dept. of Commerce is developing a recap of the processes and products of the 1997 flood recovery.
North Dakota	The state is continuing with education, press releases and articles.
Canada	Environment Canada is involved in "Project WET". Environment Canada's web site "Green Lane" provides Internet links to flood information including the Flood Damage

	Reduction Program.
Manitoba	Flood information is provided in Natural Resources' Home Page.

Flood Policy Review	
2. ***A meeting of senior federal-provincial and federal-state officials in each country should be convened to undertake policy level discussions and an examination of the 1997 flood. Special attention would be placed on extending the positive aspects of flood preparation and management during 1997 to future events throughout the Red River valley.***	
United States	
Minnesota	Dept. of Public Safety/Dept. of Natural Resources - Div. of Emergency Management to coordinating state involvement.
North Dakota	
Canada	
Manitoba	Natural Resources proposes to establish a coordinating committee for a forum.
3. ***Increased liaison on a regular basis among the emergency management organizations throughout the basin should be a priority in order to establish better appreciation for the manner in which each operates during an emergency.***	
United States	▪ The Prairie Emergency Management Advisory Committee (PREMAC), which includes emergency management personnel from North Dakota, Montana, Minnesota, Saskatchewan, and Manitoba, is discussing liaison and coordination issues. ▪ Army Corps of Engineers met with the National Weather Service and other emergency management organizations, including Minnesota Emergency Management and Dept. of Natural Resources about the 1998 spring runoff. ▪ Manitoba federal officials of the Federal Emergency Planning Coordination Committee (FEPCC) have reviewed Task Force recommendations for possible roles/activities of their departments or agencies and for possible coordinated roles/activities by the FEPCC.
Minnesota	
North Dakota	
Canada	
Manitoba	

4. During a flood, Canadian liaison officers should be present in U.S. flood emergency centers to immediately relay information to Manitoba.	
Manitoba	Manitoba Emergency Measures Organization will work with U.S. counterparts to include Emergency Measures Organization staff in U.S. Emergency Operations Committee activities where incidents may impact Manitoba.

Flood Forecasting	
5. Update and enhance existing forecast models based on 1997 data and experience, focusing specifically on improvements that can be incorporated in basin-wide forecasts prior to the 1998 season. In particular, rating curve extensions should be undertaken as soon as possible.	
United States	Rating curves have been preliminarily updated and extended using 1997 data.
Canada	Environment Canada has completed rating curve extensions.
Manitoba	Natural Resources will continue its work in updating current forecast models with 1997 data.
6. Monitor the potential effects of El Nino on 1998 weather.	
	Complete
7. All flood-forecasting agencies should ensure that they have sufficient, experienced flood forecasting staff at all times.	
United States	
Minnesota	Dept. of Natural Resources Waters reviewing how field staff can assist weather service with data gathering.
North Dakota	
Canada	
Manitoba	Natural Resources proposal to adequately staff river forecast center has been approved.

Flood Forecasts for the Public	
8. Simplify and clarify communication between flood forecasters and those with local flood emergency responsibility, throughout the basin. The dissemination of forecast information to the public through the media should be simple and the variables inherent in those forecasts easily understood.	
United States	Discussions have been held among federal agencies on how to enhance flood-forecasting communications.
Minnesota	Several meetings have been held to enhance relationship between the National Weather Service, Div. of Emergency Management, and Dept. of Natural Resources.
North Dakota	
Canada	
Manitoba	Natural Resources proposes to enhance communications and, to aid in communications of flood levels, the establishment of permanent, readily recognizable water level markers at additional sites. Culture, Heritage & Citizenship will work with Natural Resources to ensure flood information is accurate, timely and easily understood.

Floodplain Management	
9. The Province of Manitoba, and affected municipalities, should review all Designated Flood Area legislation and zoning provisions with the intent of widening the options for enforcement. A comprehensive program of early inspection and enforcement should be developed and implemented immediately. Once this program is implemented, non-compliant new structures should not be eligible for disaster assistance.	
Manitoba	The Designated Flood Area legislation has been revised and is before the Legislature. The changes: ▪ Allow for early inspections (after the new foundation or footings are complete); ▪ Stipulate penalties for non-compliance including fines, stop work orders and ineligibility for future flood damage or disaster assistance; and ▪ Enable the government to place a notice against the title advising that the structure does not comply with floodproofing criteria and is, therefore, ineligible for flood damage assistance. Rural Development is reviewing with municipalities land use planning bylaws and development control enforcement capabilities, and is preparing an enhancement strategy.
10. In the United States, more stringent adherence to existing policies is a necessary, immediate and effective first step for better floodplain management. Emphasis should be placed on	

increasing participation in the flood insurance program.	
United States	
Minnesota	Flood Insurance Report prepared. August 97 MN legislature passed a law to require a higher level of protection (freeboard) for new buildings.
North Dakota	
11. Update profiles, maps and flood frequency curves for the Red River basin.	
United States	Some funding has been provided through FEMA and the Army Corps of Engineers Floodplain Management Services Program, more may be made available, and work has been initiated to update the Red River main stem hydrology.
Minnesota	
North Dakota	The National Weather Service, Corps, Federal Emergency Management Agency (FEMA), State Water Commission and others have held meetings in Fargo and Grand Forks to discuss technical issues related to Red River hydrology and hydraulics.
Canada	Environment Canada has funded profiles of some CNR and CPR railway lines in the basin.
Manitoba	Natural Resources is updating river profiles, flooded area maps and flood frequency curves. Work is being done with the Manitoba Water Commission's consultant. Manitoba Highways has 'profiled' all inundated highways.
Task Force	To be pursued in Task Force research.

Structural Measures	
12. Plans to implement new flood mitigation and flood-proofing measures for individuals and communities – if sound in economic, environmental, engineering and social terms – should continue as rapidly as possible. All such measures, whether by government or individuals, should be coordinated and examined to determine possible damage to others within the basin.	
United States	The Army Corps of Engineers is part of a multi-agency task force to review funding requests for post-flood measures. The Corps has visited many communities and provided technical assistance for the short term measures and has initiated studies for long term measures at a number of communities.
Minnesota	$17 million in State funding in 1997 has been spent on specific flood mitigation efforts

	1998 legislature appropriated $30 million to continue efforts and $4.5 million for studies and mapping.
North Dakota	Major flood-proofing and mitigation projects are underway. Grand Forks and East Grand Forks have a major effort underway. Fargo also has a major effort involving acquisition and diking. A dike meeting has been held in Wahpeton.
Canada Manitoba	In July 1997 the federal government committed $12 million and the province $46 million for a structural improvements and works program. A $6 million federal-provincial flood proofing and study program was announced in July 1998. Federal-provincial discussions on further flood mitigation and flood proofing initiatives are ongoing.
Task Force	Task Force's hydraulic models will assist in the assessment of project effects.

Coordination

13. Pursue agreement between the United States and Canada to enable comprehensive civil emergency planning and management that takes into account current trade agreements between the two countries, and in particular, allows for the cross-border transfer of supplies, equipment, contracting services and labor in the event of an emergency. The agreement should look into the possibility of developing regionally specific arrangements, including state-provincial protocols.

United States	▪ Secretary of State Albright and Minister Axworthy agreed to task the IJC to develop a framework for a flood emergency agreement for the Red River basin. ▪ Prairie Regional Emergency Management Advisory Committee (PREMAC) is having discussions involving federal, state and provincial emergency planning officials ▪ PREMAC members to independently review Task Force recommendations for areas of possible PREMAC involvement.
Minnesota	
North Dakota	
Canada	
Manitoba	

14. North Dakota and Minnesota should review emergency measure agreements in the light of the experience of the 1997 flood.

Minnesota	
North Dakota	

15. A basin-wide flood forecasting committee patterned on the Souris River Flood Forecasting

Liaison Committee should be established for the Red River basin.	
United States	Secretary of State Albright and Minister Axworthy agreed to task the IJC to define the way in which the proposed Red River basin-wide flood forecasting committee would operate.
Canada	
Task Force	The Task Force has asked the Souris River Forecasting Liaison Committee for advice on structure and terms of reference and will make recommendations to the IJC.
16. In the U.S., where regional operations of federal agencies are divided by the Red River, a lead region should be appointed for emergency operations when a flood is forecast.	
United States	

Flood Emergency Plans	
17. All flood emergency plans within the basin should be reviewed in the light of the lessons learned during the 1997 flood to prepare more effectively for the next event.	
United States	Army Corps of Engineers emphasizes the preparation and updating of flood emergency plans when coordinating with communities through the Corps' technical assistance program. The Corps is reviewing flood preparedness measures.
Minnesota	Division of Emergency Management will assist local jurisdictions.
North Dakota	Dept. of Emergency Management has done a risk assessment on items that need to be accomplished in the short-term. The work was done with local officials in the Red River Valley. Items included are flood insurance, debris management, warning system improvements, and planning procedure.
Canada	Federal Emergency Planning Coordination Committee has reviewed plans among federal departments.
Manitoba	Departments are reviewing and updating their emergency plans. Manitoba Water Commission is reviewing existing community action plans and evacuation criteria, and lessons learned.
18. Each jurisdiction with responsibilities for evacuation within the basin should establish an evacuation protocol within its emergency operation plan. Particular attention should be given to the clarity and public dissemination of the protocols to help prevent confusion at the time of evacuation. Evacuation plans affect different parts of the population in different ways and plans should take into consideration the specific requirements of vulnerable groups, such as nursing home residents.	

United States	Evacuation plans are expected to be part of the flood emergency plans, as discussed in No. 17.
Minnesota	Dept. of Public Safety-Div. of Emergency Management will be working with local jurisdictions.
North Dakota	
Canada	
Manitoba	▪ Evacuation plans and communication strategies of various departments being reviewed and modified to become more proactive, accurate, clear and effective. ▪ Increased training and education at health care facilities, regional health agencies and municipalities for emergency preparedness.

Emergency Communications	
19. Establish sufficient information centers prior to and during a flood event, through 1-800 hot lines or other well-publicized toll-free telephone numbers, to provide critical information to residents of the flooded area before, during and after the event. Enhance the opportunities for Internet access, particularly for small communities and rural areas.	
United States	
Minnesota	Dept. of Public Safety-Div. of Emergency Management will establish hotline and joint public info centers.
North Dakota	
Canada	
Manitoba	Departments are working to improve information dissemination, such as: ▪ Additional temporary Natural Resources flood liaison offices ▪ Updating Natural Resources' 'flood information' home page ▪ Emergency Measures Organization 1-800 number for citizen inquiries ▪ Family Services--Red Cross MOU ▪ Community Internet sites ▪ Health information fact sheets.

Human Impacts	
20. Trauma teams emergency response teams and personal decision-management teams should be maintained until the current demand for services subsides.	

United States	
Minnesota	Dept. of Public Safety-Div. of Emergency Management will work with local jurisdictions. No funding is available at this time.
North Dakota	
Canada	
Manitoba	▪ Proposals are being considered for trauma team to deploy at the start of an incident. ▪ The resources and roles needed for prolonged emergencies are being reviewed for recently established Regional Health Authorities. ▪ The current 13.5 staff years allocated for trauma teams will be maintained, despite funding reductions.

21. In future times of crisis, such support teams should be established early and begin work as soon as possible.

United States	
Minnesota	Dept. of Public Safety-Div. of Emergency Management will work with local jurisdictions. No funding available at this time.
North Dakota	
Canada	
Manitoba	▪ The Emergency Measures Organization's emergency plan calls for immediate trauma team deployment. ▪ Role of Regional Health Authorities in mobilizing trauma teams will be clarified. ▪ Formal relationships with Family Services relating to "Personal Services" have been proposed.

22. Information about flooding and the measures in place in case of flooding in the Red River valley should be introduced into the school curriculum throughout the basin, and in particular, in the communities most at risk.

United States	
Minnesota	Project WET (water education for teachers) is in place in Minnesota, North Dakota and Manitoba. The K-12 educational materials will be expanded to enhance awareness of

North Dakota	flooding and flood preparedness. Emergency preparedness material to be offered through school divisions as well as activity books and resources on psychosocial issues.
Canada	Appropriate curriculum will be developed.
Manitoba	

Canadian Forces	
23. Earlier notice should be given to the Canadian Forces of their potential involvement in flood fighting in order to allow them additional preparation time.	
Canada	Under review by Department of National Defence.
Canadian military and civil authorities should reach a common understanding of the types of assistance available, particularly in terms of aid to local law-enforcement authorities.	
Canada	Under review by Department of National Defence.
Manitoba	Reviewing Emergency Plan to enable easier access to Department of National Defence assistance for specialized resources, such as Aero Medical aid.

Modeling	
25. Develop hydraulic models for the Red River and its major tributaries, capable of being expanded for use in forecasting and analyzing overland flooding, as well as for floodplain management.	
United States	U.S. Geological Survey is preparing two reports on the 1997 flood and the Army Corps of Engineers is updating main stem river profiles using existing hydraulic models
Minnesota	The states will be working with the Task Force on the development of hydraulic models.
North Dakota	
Canada	Environment Canada has developed a one-dimensional "quick pass" model to assess and identify areas of data deficiency and need for higher resolution data.
Manitoba	▪ The province will be working with the Task Force on the development of hydraulic models. ▪ Manitoba Water Commission has undertaken hydraulic (MIKE 11) analysis of the effects of diking floodway operations.
Task Force	Task Force is preparing to let contract for the development of a one-dimensional hydraulic model for the basin north of Grand Forks.

26. Document the 1997 overland flow areas within the basin, high-water marks and head losses, wind effects, timing and extent of road or dike breaches and blow-outs, and data networks used during the flood. In addition, document the shape, elevation and alignment of roads, dikes, levees and drains, including the size of bridge and roadway openings.	
United States	The Army Corps of Engineers has documented the high water marks for the flood and satellite imagery has defined flooded areas.
Minnesota	The states will be working with Task Force.
North Dakota	
Canada	Data collection in progress in connection with "quick pass" model analysis.
Manitoba	Creating new maps showing: ▪ The revised boundaries of the Designated Flood Area (based on the 1997 flooded area); ▪ 1997 flood levels (based on high water marks obtained following the 1997 flood); and ▪ Newly established flood protection levels, using aerial reconnaissance and ground truthing. The information will be used to administer the 1997 flood-proofing program, guide future development and assist in the development of hydraulic models, in cooperation with the Task Force. ▪ Highways & Transportation will be maintaining its database of water levels.
Task Force	The Task Force will be working to identify and fill gaps in data.
27. Develop a consolidated database containing hydrometric, climatic, topographical and other technical data within the basin needed to improve forecasting and modeling capability.	
United States	Several US federal agencies are in the process of identifying database needs and means of making the data more readily available to those needing the information. States, the province and Canadian agencies are working with the Task Force on database development.
Minnesota	
North Dakota	
Canada	
Manitoba	

Task Force	

The Hydrometric Gaging System	
28. A high priority should be given to raising existing gages above the 1997 high-water level or replacing them.	
United States	U.S. Geological Survey is developing designs and costs for making several gages more flood damage resistant.
North Dakota	The State Water Commission and U.S. Geological Survey are developing designs and costs for hardening several gages. Considerably more work is needed.
Canada	
Manitoba	The raising of gauges in Manitoba has been completed by Natural Resources.
29. Add to the current gaging system in the basin and, where needed, automate reporting to increase information for flood forecasters.	
United States	
Minnesota	13 gages for flood warning are being added to the system.
North Dakota	
Canada	
Manitoba	Provincial funding has increased for 1998 and may be further increased in 1999. Natural Resources proposes to modernize 36 stations, reactivate 10 others and establish 11 new ones in Manitoba, some with automated data retrieval to enable real-time access and be compatible with Water Survey of Canada's hydrometric network.
Task Force	Task Force will identify real-time flow gauging needs and recommend implementation methods.

Airborne Gamma Surveys	
30. Depending on the flood outlook, the frequency of airborne gamma snow survey flights over the Manitoba portion of the Red River valley should be increased. Increasing the density of the network by adding more flight paths should also be considered.	
Manitoba	Naturals Resources proposes to add a third survey flight and increase the density of the sampling lines in high-risk years.

Doppler Radar	
31. In view of the critical need for accurate flood forecasting in the Red River valley, Environmen Canada should identify Winnipeg as the highest priority location for the new radar installation.	
Canada	Environment Canada pursuing the advancement of the installation of new Doppler Radar for Spring 1999.

Ice Management	
32. Innovative methods of reducing ice jams should be reviewed and expert advice sought on how ice jams may be diminished. This subject should be explored at a workshop on ice control held in the winter of 1998 and attended by international experts and basin officials. The adverse and beneficial effects of ice management on flooding and the environment need to be carefully considered.	
United States/Canada	▪ Environment Canada's National Hydrology Research Institute exploring cooperation with Army Corps of Engineers' Cold Regions Engineering Laboratory. ▪ The Corps of Engineers was in line to study the effectiveness of ice dusting in 1998. This may occur in 1999 depending on weather and funding.
Minnesota	Ice dusting was proposed for the 1998 run-off, but it was not needed.
North Dakota	The National Guard did not do any ice dusting in 1998 due to time restraints.
Manitoba	Ice management measures are being reviewed. Consideration is being given to an ice workshop. New ice jam information will be applied to land use planning and subdivision application reviews.

Flood Information Archives	
33. Information available to individuals, government and non-government organizations and others who contributed to the flood-fighting effort in 1997 should be gathered and made available at a central basin-wide archive or archives in each country.	
United States	A number of post-flood reports have been prepared or are going to be available shortly
Minnesota	Dept. of Natural Res. has started to do this. Minnesota has developed a clearinghouse for state information and data. More work is needed.
North Dakota	Dept of Emergency Management and the National Guard have developed a detailed list of agencies and individuals involved in the North Dakota flood fight.
Canada	

Manitoba	Information is being collected, but there has been no decision on a central repository.

Hazardous Products	
34. Liaison among governments and industry associations throughout the basin should be encouraged and strengthened. Communications should be extended to other businesses, individual homeowners and farmers.	
United States	
Minnesota	Department of Public Safety - Div. of Emergency Management will coordinate liaison and communications activities.
North Dakota	
Canada	
Manitoba	Proposals have been developed for a database and improved communication with businesses, associations, product dealers and individuals in valley. Environment Manitoba material would include information about hazardous materials in the cycle from manufacturers to end use with a view to developing flood-proofing measures for hazardous products.
35. The development of a broad public awareness program within the Red River floodplain should be started to encourage home-owners and farm operators to collect and properly dispose of all waste products that present a contamination hazard. There should also be an immediate and concerted effort to remove or secure hazardous materials stored in the floodplain.	
United States	
Minnesota	Pollution Control Agency, Dept. of Health, and Dept. of Agriculture are reviewing the issue.
North Dakota	
Canada	
Manitoba	Current collection programs are being continued and extended to rural areas. A public awareness program is being prepared on safely storing hazardous materials in the floodplain.

36. An inventory of all major potential sources of contamination should be developed and maintained, to include location, elevation, type of material, and amount. This inventory shoula extend to the agriculture industry and include intensive livestock operations.

United States	
Minnesota	Department of Public Safety - Div. of Emergency Management/Emergency Response Commission has collected the data.
North Dakota	The North Dakota State Health Department is reviewing what inventories of hazardous waste are available. There are lists available but the extent and detail are unclear.
Canada	
Manitoba	▪ Manitoba Environment is considering licensing changes to augment the current database and extend licensing to facilities not presently covered. ▪ Manitoba Agriculture is proposing an inventory to include protection levels of manure storage lagoons and intensive livestock operations. Farm chemicals, petroleum products and other materials, such as waste, lumber, tires, tanks and old buildings would be identified and form part a flood preparedness assessment. ▪ Rural Development maintains an inventory of major sources of contamination.

37. A review of legislation on the management of hazardous materials should be conducted throughout the basin.

United States	
Minnesota	Department of Public Safety - Div. of Emergency Management/Emergency Response Commission will be reviewing legislation.
North Dakota	
Canada	
Manitoba	There is a proposal to review legislation on the management of hazardous material to ensure protection of flood prone areas.

Groundwater Contamination

38. Conduct an inventory of all abandoned and active groundwater wells throughout the basin and institute an aggressive program of properly sealing abandoned wells and flood-proofing active wells against floodwater contamination from the surface.

United	

States	
Minnesota	The state has an active program to inventory abandoned unused wells on state-owned land. Unused private wells are required to be sealed by State law upon property transfer.
North Dakota	
Canada	
Manitoba	Records of over 80,000 water wells are being maintained by Natural Resources and new records will be added. Consideration is being given to new legislation requiring a vendor to identify abandoned wells similar to that in Minnesota.

Levee/Dike Design	
39. The natural and beneficial functions of the floodplain must be considered in the design of new levees.	
United States	
Minnesota	The state is promoting setback levees and has $200,000 available for alternative flood control measures.
North Dakota	
Canada	
Manitoba	Natural Resources is considering the issues in all Natural Resources' dike designs. Rural Development will advise municipalities and developers to consider the dike design in their land use planning and development processes.
Task Force	The Task Force may develop further guidance.

Interbasin Hydraulic Connection	
40. Reasonable measures should be implemented, consistent with current operating plans, to prevent (if possible), the movement of water between the Red River and Mississippi River basins at Lake Traverse-Big Stone Lake.	
United States	
Minnesota	Will work with Task Force.

Task Force	The Task Force will be investigating the issue.